BOILER, BURNER, OVERFIRE AIR & SAH- SETUP< TUNING & TESTING Rev1 03/24/04

Testing is required following the Unit 2 Major Outage where the following modifications were made:

installation of new ABT low NOX Burners
new ABB flame scanners,
installation of new BPI Overfire Air system,
Boiler Superheat Platen extension,
Secondary Air Heater element changeout,
pulverizer primary air flow replacement (CAMS)
Overfire Air Flow measurement (CAMS)
individual Burner Air Flow Monitoring System (IBAM)
PI information computer and historian upgrade to version PI3
Information Computer upgrade (ABB) (initial phase of DCS controls upgrade)

Tentatively completed by June 1.

NOTES: - Following the U2 Outage, Unit 2 has 950 MW gross capability (approved new unit rating).
- U2 Overfire Air System can't be operated or fully tested until the UDAQ Operating Permit is received.
- Need availability of all 8 pulverizers for 8 weeks to complete all burner, OFA and UDAQ environmental required testing.

DETAILED SCHEDULE- U2 UNIT STARTUP, Sat 3/27/04

Initial Burner Adjustments and Flame Scanner Tuning (1st lighter and coal fires) (NO BIDS- on startup)
1st Oil Fires- NEW SCANNER tuning and adjustments. Need to cycle thru all 8 rows of lighters for tuning
notify- Jerry Finlinson, ABB rep, I&C Techs

1st Coal Fires (start- 1st row B or G)- requires BURNER ADJUSTMENTS for flame shape & stability
Need to cycle thru all 8 pulverizers for initial burner adjustments and scanner tuning
notify- Aaron Nissen, Garry Christensen, ABT rep- Terkle Larson & Jerry Finlinson, ABB rep, I&C Techs

Burner Turndowns (BIDS- 500 MW)- Burner Adjustments and Flame Scanner Tuning (BIDS- test on 2 night shifts, 3/29& 30/04) Needed to verify flame position and scanner sighting due to new burners and scanners, plus modifications using internal baffles to windbox, changes in secondary air damper positions and windbox duct pressure required for the overfire air system setup
Testing needs to be with 4 pulverizers in-service staggered front and rear wall (to enable visual sighting of all flames). Each pulverizer needs to be ramped from minimum to maximum feeder speed (with NO Overfire Air).
Testing by Aaron Nissen, Garry Christensen, ABT Rep, Jerry Finlinson, ABB Rep, and I&C

Setup Economizer Backpass Test Gas Analyzers and Test Grid (NO BIDS)
Setup test grids at the boiler economizer outlet (east and west), primary air heater outlet (east and west), secondary air heater outlet (east and west) with gas sample points and thermocouples, plus stack mid-point elevation sample point station. Setup includes: gas sample lines, vacuum pumps, chillers, bubblers, knockout bottles, desiccant filters, dust filters, metering stations, calibration stations (with zero and full span calibration bottles), 14 test gas analyzers (O2, CO2,& CO), data acquisition system and archiving software (at economizer, PAH outlet, SAH outlet and stack mid-point.

Coal Line Burner Balancing- Dirty Air Flow Tests (all 8 pulverizers) (NO BIDS- during normal operation) Each pulverizer tested individually (but need availability of all 8 pulverizers), tests conducted at 80% feeder speed

Tests conducted by Garry Christensen and Rob Jeffery

Pulverizer Primary Air Flow (CAMS) Calibration Testing (NO BIDS- during normal operation)
Required due to replacement of the pulverizer primary air flow elements. Testing consists of feichheimer probe flow traverses to characterize new pitot tubes.

Prim Air Flow (CAMS) -Testing has to be done with each pulverizer on-line and able to ramp from 50% feeder speed to 75% and 90% (backoff pulv if it starts loading up).

Testing coordinated by Jerry Finlinson, testing conducted by Air Monitoring Systems

Burner Air Flow Measurement System (IBAM) Checkout (NO BIDS- during normal operation)
Checkout air flow measurement system, air line plumbing, flow transmitters, and calculation package.

Checkout coordinated by Jerry Finlinson

Boiler Backpass Grid- Fine tune Burner Adjustments (targets CO < 100 ppm) (Initial baseline and checkout- NO BIDS, final tuning will require BIDS- wait to submit)
Start out with all 8 pulverizers in- service and trouble shoot & fine tune burners based on the Economizer Outlet Test Grid and then systematically rotate each pulverizer out of service and continue balancing

Testing by Aaron Nissen, Garry Christensen , Dave Spence & Rob Jeffery, with test equipment from Power Generations Technologies (PGT)

Burner & Secondary Air Heater (& Prim Air Heater) Acceptance Testing (BIDS- wait to submit), also see test plan. Full Load Tests at various pulv configurations and O2 levels. Test results based on the Flue Gas Test Grids

Testing by Aaron Nissen, Garry Christensen, Dave Spence & Rob Jeffery, with test equipment from PGT)

Overfire Air Flow System Checkout and Turnover NO BIDS
System walkdown, final (hot) damper stroking, and controls checkout.
NOTE: Need Operating Permit to place Overfire Air System In-Service and fine tune burners.

Checkout by Phil Hailes

Overfire Air Flow (CAMS) Calibration Testing (NO BIDS- during normal operation)
NOTE: Need Operating Permit to place Overfire Air System In-Service and fine tune burners.
Required due to new system installation. Testing consists of feichheimer probe flow traverses to characterize new pitot tubes.

Overfire Air Dampers and CAMS- Testing of dampers (inlet dampers, 1/3 and 2/3 dampers) will be done with north and then south side dampers. Flow traverse calibration points will be at 1/3 dampers open, 2/3 dampers open and both 1/3 & 2/3 dampers open (inlet dampers full open).

Testing coordinated by Jerry Finlinson, testing conducted by Air Monitoring Systems

Boiler Backpass Grid- Fine tune OFA and Burner Adjustments (targets CO < 180 ppm) (Initial baseline and checkout- NO BIDS, final tuning will require BIDS- wait to submit)
NOTE: Need Operating Permit to place Overfire Air System In-Service and fine tune burners.
Start out with all 8 pulverizers in- service and fine tune burners based on the Economizer Outlet Test Grid and then systematically rotate each pulverizer out of service and continue balancing

Testing by Aaron Nissen, Garry Christensen, Dave Spence & Rob Jeffery, with test equipment from PGT

UDAQ Envir Required Demonstration Testing (BIDS- wait to submit), also see test plan
Complete State (UDAQ) required Burner and Overfire Air Tests to demonstrate NOX reduction but no allowable increase in CO emissions (base of 180 ppm). Operating parameters- vary OFA flow (o/s, 1/3, 2/3 & both dampers full open) and vary O2 levels (same as testing last year on Unit 1). Also will satisfy Overfire Air acceptance testing.
NOTE: Need Operating Permit to place Overfire Air System In-Service and fine tune burners.

Testing by Aaron Nissen, Garry Christensen, Dave Spence & Rob Jeffery, with test equipment from PGT

IPSC TEST SCHEDULE IGS Unit 2 Startup 04/2004

APRIL 2004

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
3/28 **U1 STARTUP**)	**3/29** U1 500 MW Turndowns Night shift	**3/30** U2 950 MW Turbine Enthalpy Drop w/ Alstom U1 500 MW Turndowns Night shift	**3/31** ID FAN TESTING (all week long)	**1**	**2**	**3** **U1 Off-Line** -Overspeeds -Remove fine mesh screens -Turb Balance
4	**5** XXXXX U2 BOILER	**6** OFF-LINE TEST GRID	**7** TRANSFMR SETUP &	**8** BUSHINGS CHECKOUT	**9**	**10**
11 **Easter Weekend**	**12** U2 DIRTY PA FLOW	**13** AIR FLOW CALIBRATIO	**14** TESTING NS ON CAMS	**15** (8 PULVS) SYSTEM	**16**	**17** Boiler Safety Valve- Hydro Sets (3 days)
18	**19** U2 BURNER	**20** DIAGNOSTIC	**21** TESTING &	**22** TUNING	**23** (W/O OFA)	**24**
25	**26** U2 BURNER	**27** TUNING	**28** (2^{ND} WEEK)	**29**	**30**	**1**

MAY 2004

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2	**3** U2 BURNER	**4** ACCEPTANCE	**5** TESTING	**6**	**7**	**8**
9	**10** U2 SCNDRY	**11** AIR HEATER	**12** TESTING	**13**	**14**	**15**
16	**17** U2 BURNER	**18** & OFA	**19** SETUP &	**20** TUNING	**21**	**22**
23	**24** U2 STATE	**25** ENVNMNTL	**26** TESTING	**27**	**28**	**29**

JUNE 2004

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30 Memorial Day Weekend	**31** **Memorial Day**	**1**	**2**	**3**	**4**	**5**
6	**7** Annual Coal	**8** Pile Inventory	**9** Survey	**10** (5 days)	**11**	**12**
13	**14**	**15**	**16**	**17**	**18**	**19**
20	**21**	**22**	**23**	**24**	**25**	**26**